

THE HISTORY OF THE EARLY WATER SUPPLY OF BALTIMORE.

K. F. Spence.

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INTRODUCTION

From the earliest records of civilization have come the accounts of man's early attempts to secure for his home a supply of good and clean water. In the Bible we read of the "hewers of wood and drawers of water", and other similar passages relating to the water supply of early peoples. Damascus had its conduits, and King Solomon built aqueducts at Jerusalem, and he is said to have built the foundations and aqueducts of Tyre.

The wonderful aqueducts built by the Romans are a monument to their genius and engineering ability, and they were constructed so well that even today several are used to help supply Rome with water. The Greeks carried conduits under streams, cut through mountains, and even went under the sea in the case of the city of Syracuse. Two of the conduits that supplied Athens were carried under the Illisus River. These conduits are noted for their remarkable structure and engineering feats.

After the decline of Roman Power in Europe, the people did not realize the necessity for pure and wholesome water, and it is said that this was one of the greatest factors causing such pestilence and plague that swept over Europe. Probably the first water pipes laid in Europe were laid in London. They were of lead and were laid about 1235.

This city was supplied by a private water company as early as the sixteenth century. Other European cities later put down wood pipes and from then on the universal demand for public water supply has gradually increased. One of the Venetian Ambassadors in his report to the Republic in 1410, said that there were pipes in the streets with pressure enough to raise the water to the top of the highest building. He didn't mention the height of the building.

In America little was done in the way of public water supply before the eighteenth century.

During its early history, Baltimore was supplied by many springs of pure and excellent water, but as the town continued to grow, these springs became contaminated and another supply of water had to be found. From a rock cliff between Lexington and Center streets, a great spring gushed forth, and for many years this "City Spring" was the chief supply. Col. Howard's Spring, on Charles Street between Center Street and Mount Vernon Place, was also noted for its excellent water. Around these two springs, the earliest of Baltimore's finest residences were clustered.

EARLY ATTEMPTS TO FORM A WATER COMPANY

In 1787, the first attempt was made to establish a water company, but it met with such little favor that the proposition was dropped. Again in 1792, an effort was made, and on the 23rd of December of that year, the Maryland Legislature passed an act "authorizing the Maryland Insurance Company, under the name of 'Baltimore Water Company', to supply the town with water by pipes from a sufficient reservoir". But from the lack of public interest, this second effort failed as did the first, and nothing was done by the company. Even after the city was incorporated in 1796, the people continued in their attitude of indifference. At the first meeting of the City Council it was recognized that Baltimore needed a

supply of water in the event of a conflagration, but only appropriated \$1,000 "to erect and maintain pumps in the streets, lanes and alleys of Baltimore". Again in 1799, the subject was discussed and a commission was appointed to examine the creeks and streams in the vicinity of the city and to give a report on the practicability of conveying their water into the city. Gwynn's Run, Jones Falls and Herring Run were examined, and the report submitted stated that Gwynn's Run was the most desirable source of supply.

Upon the report of the committee, the City Council authorized a lottery to raise the necessary money. Surveys and plans were made out, but the pestilence of 1800 put a stop to all work until December of that year when the State Legislature passed a bill authorizing the Mayor and City Council to procure water for the city of Baltimore.

The newspapers of the City at this time stated that the people were of the opinion that a public water supply was beyond the pecuniary ability of Baltimore City to accomplish. The matter was again dropped until 1803, when the City Council appointed a board of twelve commissioners. This board was authorized to introduce a supply of "pure and wholesome water". Under the direction of the board, many springs near the head of Carroll's Run were collected and were about to be piped to the City when the work was stopped by an injunction obtained by the property owners upon whose land the pipe was to be laid.

Once more the project of supplying the City was abandoned. Having made so many unsuccessful attempts, the Mayor, Mr. Calhoun, asked the City Council to adopt any measure to remedy the situation. And so they authorized the Mayor to receive proposals for introducing a permanent supply of water into the city.

THE BALTIMORE WATER COMPANY

Realizing the imminent necessity for a public supply of water, at a meeting held on April 20th, public spirited citizens formed an association for the purpose of "Introducing a copious supply of wholesome water into the City of Baltimore", and applied to the State Legislature for a charter of incorporation under the name "The Baltimore Water Company". The charter was immediately granted, but owing to objectionable restrictions, the corporation refused it. Subscriptions for the company were very hard to obtain, and had not the insurance companies and other public institutions come to their aid, this company would have met the same fate as the former proposals.

The company purchased "several parcels of land" from Messrs. John Eager Howard, Josias Pennington and James Ogleby embracing water privileges in that part of Jones Falls Valley which lies just above and below present Eager Street bridge. Nothing was said about the former proposition of

Gwynn's Run, so it is assumed to have been all out of consideration. This took place in the latter part of 1804, when the company was composed of John McKim, President, and Wm. Cooke, John Donnell, Solomon Etting, Jas. A. Buchanan, Jonathan Elliott and James Mosher, directors.

Having secured the services of an engineer, Mr. John Davis, the company proceeded to erect a pump house on the property now occupied by the office of the Northern Central Railroad on Calvert Street. The water came from Salisbury Mill, near the site of the Belvidere Bridge, by canal to the pump house and was then lifted by pump into a reservoir at the southwest corner of Franklin and Cathedral streets, and by water-wheel into the reservoir at Calvert and Center streets.

EARLY TYPES OF PIPES

In June 1805, the Company contracted with Sam Hughes of Harford County for a supply of cast-iron pipe of sizes varying from $2\frac{1}{2}$ " to 6", at prices from \$65 to \$80 per ton. But most of the early pipes laid were made of wood -- locust or spruce pine logs, 12" - 15" in diameter with a 4" hole bored through them for carrying the water. This wood pipe proved very unsatisfactory after 25 years of service, and after May 1829, all wood pipes were replaced by cast-iron. But at this time there were 42,230 lineal feet of wood pipe and 30,530 feet of iron pipe. Baltimore was one of the

earliest cities of the world to lay cast-iron mains. It is said that some of the first cast iron pipe was imported from England.

THE FIRST PUBLIC SUPPLY

Again, in November 1805, the Company applied to the Legislature for an "act of incorporation", but action seemed to be so slow that the Company asked the Mayor and City Council for the privilege "to open streets, lanes and alleys for the purpose of laying down water pipes". In December, the Directors and a Committee of the City Council held a conference in regard to the purchase of the Company's stock by the City, but nothing definite was settled, and in February 1806, the City Ordinance granted permission to lay down pipes. Previous to May 1807, the Company appears to have furnished no water to the City except a small amount which was supplied by natural flow from Col. Howard's Spring. This wonderful spring is now covered by a terrace and walk, on Charles Street, just north of Center Street. It was obliterated years ago to make way for the improvements of the City.

But in May 1807, the pumps were put into operation and henceforth water was supplied to the City -- almost exclusively through the reservoir at Franklin and Cathedral streets.

In December 1808, the State Legislature granted a desirable charter that was accepted by the Company.

ADDITIONAL CONSTRUCTION

No additional construction work was done by the Company from 1808 to 1830, during which time the yearly earnings gradually increased from somewhat less than \$9,000 in 1811, to about \$20,000 in 1830. At this date, the Company offered to sell out to the City for \$350,000 but the offer was declined. During the three years, 1830-33, the Company enlarged their privileges by the purchase of Salisbury Mill, near the site of the Belvidere Bridge, and they also expended large sums in the construction of a new pump house, on the site of the old one, and a new reservoir. No record has been found of its exact location. Consequently, after this additional construction, the Company raised its demand to \$500,000 and negotiations were again suspended. At this date, the annual income was over \$21,000, with 2,164 accounts on the books.

In February, 1835, the Company was again approached by the City Council in regard to the purchase of the water works, but after some correspondence in which the Company asked \$550,000, the matter was dropped by the withdrawal of the Company's offer in April of that year. At this time,

there were eighteen miles of water pipes laid down in the City, one quarter of which **was** wood, one quarter of the old defective cast-iron and the remainder of the improved type of 1862 - the bell and spigot pattern. At this time, the annual receipts were \$25,500.

THE CITY PURCHASES THE COMPANY

From 1835 to 1852, the demand for water increased quite rapidly and the company kept up with the demand by the purchase of additional privileges around Jones Falls, erecting new pumps, new reservoirs, and extending the pipe system throughout the city. As a result, the income in 1852 was \$80,000. At this time, the City again applied to the Company, asking the demands of the Company. They agreed to sell the Works to the City for \$1,250,000, but though this was not accepted, it led to negotiations which culminated in the sale of the entire works to the City in August 1854, for \$1,350,000. The sale included not only the water works proper, but several large mills and much valuable real estate which the Company had purchased for its water rights and privileges.

The water works proper, at this time, consisted of two small pools of water in the valley of Jones Falls, which were formed by the original dams of the Mt. Royal and Rock Mills, and from which the whole supply of water for the City was conducted in large cast-iron mains to a receiving reser-

voir within the city limits. This reservoir was located on the east bank of the Falls, a short distance below the Charles Street bridge. From here it was distributed by gravitation to all parts of the city not over 60 feet above mean tide, and for those parts of the city over 60 feet the water was raised by pumps to a second reservoir situated at Charles and Chase streets, and thence distributed to all parts of the City not over 136 feet above mean tide.

Distributing pipes at this time were almost exclusively of iron, and formed a net-work about fifty miles in extent throughout the City.

The combined capacity of the two reservoirs was only 25 millions of gallons, and the capacity of the two mill ponds which could be made available was only 10 millions of gallons more. Consequently the water was very seldom free from earthly impurities, and was often cloudy or turbid from recent rains.

NEED FOR INCREASED SUPPLY

The City was growing so rapidly at this time that the city authorities deemed it advisable to provide for an increased supply of water. From 1854 to 1857 examinations and surveys were made by competent engineers for introducing an abundance of excellent water from any one of several distinct sources of supply, at a reasonable cost. Early in 1857,

the administration of the Water Department was reorganized by the creation of a Board of Water Commissioners, who were authorized to provide for an increased supply of water to the City of Baltimore from Jones Falls. Having fully investigated the subject and chosen a plan, the Board at once proceeded to make all purchases and condemnations of land and water privileges necessary to the construction of the New Works.

THE NEW WORKS

The plan selected was to deliver water at an elevation of 220 feet above tide, by natural flow only. Work was started in 1858 by the erection of a dam across the valley of Jones Falls near the place commonly known as Relay Station on the Northern Central Railway, at the point of confluence for the water-shed of the valleys of Bowen's Mill Run from the east, Roland's Run from the north, and Green Spring from the west. These runs taken together formed the head of Jones Falls. The dam and the excavation of the lake thus formed was far enough finished to be put in use in 1860, and was entirely completed in 1861.

All higher portions of the bottom of the lake were cut down so as to be at least 10 feet below normal surface of water. The excavation of the bottom of the lake comprised an area of 50 acres, and the excavated material was used to form an embankment around the margin of the lake. All vege-

table material and perishable matter was ~~removed~~ from the bottom and sides for several feet above the high water line. The lake was rip-rapped, that is, stone was placed along some portions of sides washed by choppy water, and gravel was also placed in a layer over exposed loamy portions of the bank or margin.

No kind of impurities were found during the first year of its use except that which might arise from protracted heavy rains, but this could be remedied by the construction of additional reservoirs until their united capacity equalled 20 days water supply. The supply then was only for ten days.

The surface of the lake comprised an area of 116 acres, and was 225 feet above tide. The lake held 500 millions of gallons and an additional 400 millions could be made available by drawing off the water into pipes and conveying it to the city by means of the aqueduct.

The original plan was to make the dam of earth, but owing to the danger to life and property by a possible breach and the consequent entire demolition of the struction, this plan was dropped and the dam was built of masonry sunk into bed-rock.

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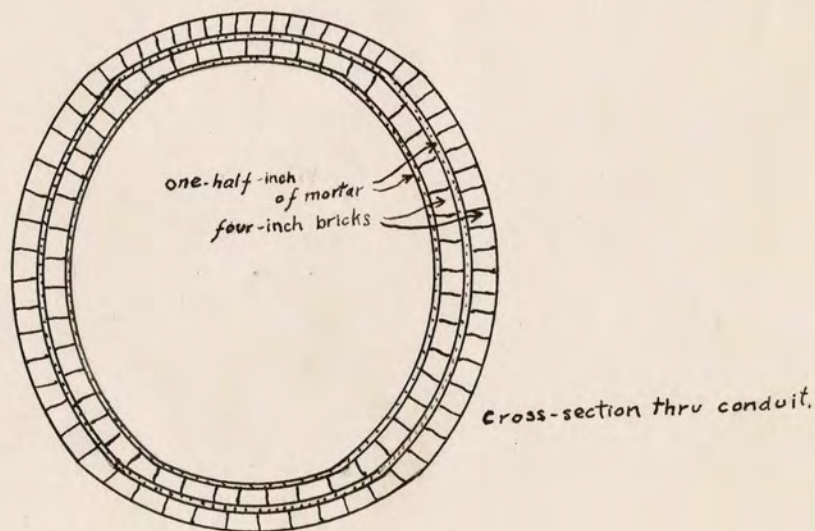
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In June 1858, ^{work} was commenced on the conduit line which began at the upper gate of Roland Dam, and went to Hampden Reservoir, a distance of 3.6 miles. The line consisted of open cuts and three tunnels whose lengths were 1,000 feet, 1,225 feet and 2,950 feet. Excavation work was completed by April 1859, and masonry work by January 1, 1860.

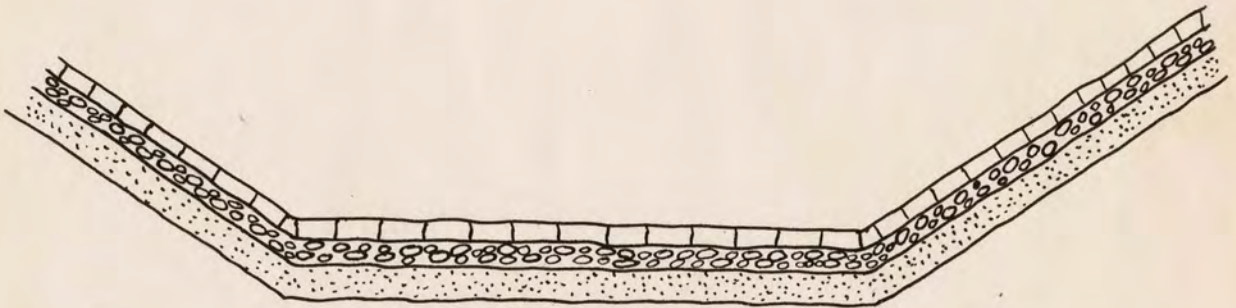
The conduit was an exact copy of that at the Cochituate Water Works. It was oval in shape, made of bricks cemented by hydraulic mortar. Man-holes were dropped in top of conduit every quarter-mile (except at longest tunnel) and were marked by a small pyramidal shaped stone over the slab which covered the man-hole. Shafts were sunk to facilitate excavation in tunnels but all were refilled on completion of work.



The water in Hampden Reservoir was 8 feet lower than in the lake (Roland Dam), and the conduit was eleven and one-half feet under the surface of the water in the reservoir.

One waste weir was placed in conduit below dam to keep the level of the water down and to prevent any waste in dry season. Another weir was placed half way between the dam and reservoir.

Hampden Reservoir is located on the Falls turnpike near Hampden village, immediately east of Druid Hill Park. It was semi-circular in form, and was covered with a lining of puddled clay 3 feet thick, then 2 feet of gravel, then stone pavement 18 inches thick. The depth of the excavation was 23 feet and depth of water 20 feet (217 feet above mean tide). Interior slopes were 3 to 2, exterior slopes were 2 to 1.



Cross-section of bottom of Reservoir.

A capacity of 50 millions of gallons included the water in the conduit. It could be supplied directly from the conduit to the City or through the reservoir.

The pipe line from Hampden Reservoir to the city limits consisted of 2 lines of pipe ~~of pipe~~, 7,100 feet long, each 30 inches in diameter. It was carried under and across

Jones Falls to a point opposite Mt. Royal Mills, thence through embankment to the pipe vault of Mt. Royal Reservoir , thence under the bed of West Oliver Street extended, to the intersection of the latter with Northern Boundary Avenue. The pipes were provided with air-cocks at high points and drain pipes at low points, to which access was made by man-holes.

Mt. Royal Reservoir was located on the old Mt. Royal Mill property cut off by the railroad. It was constructed the same as Hampden Reservoir, except it was circular in form, was 150 feet above mean tide, and had a capacity of 30 million gallons. A 20 inch drain pipe was provided for the reservoir. Water was screened before it entered the two 30 inch iron pipes that took it to the city.

Jones Falls was the only water supply until 1882, so this concludes what might be called the history of the early water supply of Baltimore.

All material for this thesis was taken from the following:-

1. Report to Chairman and Members of the Water Board, City of Baltimore, submitted on June 2, 1862, by Charles P. Manning, Chief Engineer of New Works.
2. From Report to the Water Board by Nicholas S. Hill, Chief Engineer for City, submitted on January 1, 1898.
3. From an article written in recent years by V. Bernard Siems, present Chief Engineer of Baltimore Water Department.



Site of the first pump-house, on Calvert Street.



Calvert and Center Streets, where old reservoir was located.



Franklin and Cathedral Streets; location of former reservoir on S.W. corner.



Two pictures of Howard and Center Streets where old works stood.



Concrete walk built over Col. Howard's Spring



Site of old Mt. Royal Reservoir, now demolished to make way for new street, as shown in picture



Site of former reservoir on east bank of Jones Falls, near Charles Street bridge.



Druid Hill Reservoir